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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/776,675	02/06/2001	Nobuo Ishii	08038.0048	2524 13
22852	7590	10/02/2003	EXAMINER	
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 1300 I STREET, NW WASHINGTON, DC 20005			CROWELL, ANNA M	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 10/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/776,675

Applicant(s)

ISHII, NOBUO

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 15-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 15-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on September 4, 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 4, 2003 has been entered.

Drawings

2. The drawings were received on September 4, 2003. These drawings are acceptable.

Allowable Subject Matter

3. The indicated allowability of claim 2 is withdrawn in view of the newly discovered reference(s) to Dandl (U.S. 5,370,765). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1, 3, 5, 6, 8, 15-19, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (Japanese Patent Publication 11-121196) in view of Suzuki et al. (EP 0880164) and Dandl (U.S. 5,370,765).

Note. U.S. Patent 6,076,484 is used as the English translation for Japanese Patent Publication 11-121196. The numbers in parentheses refer to the U.S. equivalent.

Referring to Figures 4(3) and 5(9), column (8), lines (36-65) and column (10), line (47) – column (11), line (5)), Matsumoto discloses a microwave plasma process system comprising: a processing vessel 1, an antenna 11 for introducing microwaves into the processing vessel, the antenna having a substantially ring-shaped antenna waveguide 12 having a substantially rectangular radial cross section and comprising a proximal end portion configured to allow flow of the microwaves in only one radial direction, a terminal end portion, and a wall having a plurality of slots 15 formed at a predetermined interval; a microwave supply source 20 for supply the microwaves to the antenna; and a connecting waveguide 21 for connecting the microwave supply source to the proximal end portion of the antenna waveguide, wherein a plasma is produced in the vessel by the microwaves introduced from the antenna.

As seen in Figure 4 and 9, the proximal end portion (side aperture) of the antenna waveguide 12 is coupled with connecting waveguide 21 and forms the curve portion 12a (substantially radial direction). In addition, the terminal end portion of the antenna waveguide 12 is closed with a conductor 17.

With respect to claim 5 and 18, the connecting waveguide 21 extends to the proximal end portion of the antenna waveguide 12 in a substantially radial direction (Fig. 5(9)).

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With respect to claim 8, the processing vessel 1 comprises a microwave transmittable top wall 4, 10 and the antenna 11 is mounted on the top wall of the processing vessel (Fig. 4(3)).

Matsumoto fails to teach a plurality of substantially ring-shaped and substantially concentric antenna waveguides.

Referring to Figures 19a-c, column 27, lines 30-56, Suzuki et al. teaches that it is known for an antenna 3 to have a plurality of substantially ring-shaped and substantially concentric antenna waveguides 43 and 44 (col. 27, lines 43-47). Also, each antenna waveguide 43 and 44 contains a plurality of slots 3b and 3b'. A plurality of substantially ring-shaped and substantially concentric antenna waveguides provides uniform microwave radiation intensity distribution for a large area. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Matsumoto with a plurality of ring-shaped antenna waveguides with apertures as taught by Suzuki et al. to allow microwaves to radiate over a large area and for uniform microwave radiation intensity distribution to be achieved.

Matsumoto fails to teach a plurality of side apertures associated with the proximal end portion of the antenna waveguides.

Referring to Figures 19a-c, column 27, lines 43-57, Suzuki et al. teaches that it is known for the microwave plasma processing system to include a plurality of side apertures 54 and 55 associated with the proximal end portion of the antenna waveguides 43 and 44 in order to introduce microwave energy. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Matsumoto with a plurality of side a plurality of side apertures associated with the proximal end portion of the antenna waveguides as taught by Suzuki et al. in order to introduce microwave energy.

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Matsumoto fails to teach that the at least one of the connecting waveguide and the proximal end portions of the antenna waveguides are configured to guide the microwaves supplied from the microwave supply source to the respective one of the antenna waveguides such that the microwaves in each of the antenna waveguides flow in the direction opposite to that of the neighboring antenna waveguide.

Referring to column 28, lines 39-50, Suzuki et al. teaches a microwave plasma processing system wherein at least one of the connecting waveguide and the proximal end portions of the antenna waveguides are configured to guide the microwaves supplied from the microwave supply source to the respective one of the antenna waveguides such that the microwaves in each of the antenna waveguides 43 and 44 flow in the direction opposite to that of the neighboring antenna waveguide. By flowing the microwaves in opposite directions, standing waves are generated to stabilize the radiant intensity of microwaves from the slots. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the microwaves of Matsumoto to flow in opposite directions as taught by Suzuki et al. in order to stabilize the radiant intensity of microwaves from the slots.

Additionally, referring to Figure 6 and column 8, line 36-column 9, line 5, Dandl teaches a microwave plasma processing system wherein at least one of the connecting waveguide and the proximal end portions of the antenna waveguides are configured to guide the microwaves supplied from the microwave supply source to the respective one of the antenna waveguides such that the microwaves in each of the antenna waveguides 46 flow in the direction opposite to that of the neighboring antenna waveguide. By flowing the microwaves in opposite directions, a stable match to the variable impedance of the plasma is provided. Thus, it would have been

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obvious to one of ordinary skill in the art at the time of the invention for the microwaves of Matsumoto to flow in opposite directions as taught by Dandl in order to provide a stable match to the variable impedance of the plasma.

6. Claims 2 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (Japanese Patent Publication 11-121196) in view of Suzuki et al. (EP 0880164) and Dandl (U.S. 5,370,765) as applied to claims 1, 3, 5, 6, 8, 15-19, 21, and 23 above, and further in view of Doehler et al. (U.S. 4,893,584).

The teachings of Matsumoto in view of Suzuki et al. and Dandl have been discussed above.

Masumoto in view of Suzuki et al. and Dandl fail to teach an aperture variable device.

Referring to column 8, line 47-column 9, line12, Doehler et al. teaches a microwave plasma processing system using an aperture variable device 150 to vary the size of an aperture 146. By using an aperture variable device, the density of the plasma may be regulated. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Matsumoto in view of Suzuki et al. and Dandl with an aperture variable device as taught by Doehler et al. in order to regulate the plasma density.

7. Claims 4, 7, 20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (Japanese Patent Publication 11-121196) in view of Suzuki et al. (EP 0880164) and Dandl (U.S. 5,370,765) as applied to claims 1, 3, 5, 6, 8, 15-19, 21, and 23 above, and further in view of Imahashi et al. (U.S. 5,432,472).

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The teachings of Matsumoto in view of Suzuki et al. and Dandl have been discussed above.

Matsumoto in view of Suzuki et al. and Dandl (U.S. 5,370,765) fail to teach a microwave absorber.

Referring to Figures 1 and 4, and column 4, lines 37-42, Imahashi et al. teaches a microwave plasma processing system using a microwave absorber 41 for absorbing reflected waves generated in the waveguide 4. The microwave absorber 41 is located in the terminal end of the waveguide 4. In addition, the microwave absorber 41 prevents the return of the reflected waves to the magnetron. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the connecting waveguide and antenna waveguides of Matsumoto in view of Suzuki et al. and Dandl with a microwave absorber as taught by Imahashi et al. in order to prevent reflected waves from returning to the microwave source.

Response to Arguments

8. Applicant's arguments with respect to claim 1-8 and 15-24 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *ame*

Luz Alejandro Mulero
LUZ ALEJANDRO-MULERO
PRIMARY EXAMINER